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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

LAMB, JAMES E., III et al.

Serial No.: 10/643,398

Filed: August 19, 2003

CROSSLINKABLE FILL COMPOSITIONS  
FOR UNIFORMLY PROTECTING VIA  
AND CONTACT HOLES

Docket No.: 27269-CNT6

Confirmation No.: 3983

Group Art Unit No.: 1713

Examiner: Kelechi C. Egwim

TRANSMITTAL

Transmitted herewith are: Transmittal, Statement regarding Disclosure of Related Pending Application(s); a copy of an Office Action mailed July 18, 2003; and return postcard.

EL 973754474 US

Express Mail No.

Respectfully submitted,

By Tracy L. Bornman

Tracy L. Bornman, Reg. No. 42,347  
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ATTORNEYS FOR APPLICANT(S)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

application of:  
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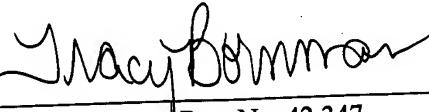
Assistant Commissioner of Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Sir:

STATEMENT

In accordance with Applicants' duty of candor toward the Office, Applicants hereby advise the Examiner of the existence of U.S. Patent Application 10/759,447, filed January 16, 2004, entitled IMPROVED FILL MATERIAL FOR DUAL DAMASCENE PROCESSES. The '447 application is a continuation of U.S. Patent Application 10/366,963, filed February 14, 2003, and subsequently abandoned. An office action was mailed in the '963 application on July 18, 2003, in which several claims were rejected as being obvious in view of one or more references. A copy of that action is enclosed.

Respectfully submitted,

By   
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/366,963	02/14/2003	James E. Lamb III	2769-CNT5	3616

23589 7590 07/18/2003  
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EXAMINER

NGUYEN, HA T

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 07/18/2003



Please find below and/or attached an Office communication concerning this application or proceeding.

ALECTO

JUL 21 2003

ENTERED BY Agm



## Office Action Summary

Application No.	Applicant(s)	
10/366,963	LAMB ET AL.	
Examiner	Art Unit	
Ha T. Nguyen	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- If Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on \_\_\_\_.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4) Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_ is/are allowed.

6) Claim(s) 1-18 is/are rejected.

7) Claim(s) \_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 14 February 2003 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_ is: a) approved b) disapproved by the Examiner. If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_



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**DETAILED ACTION**  
***Claim Rejections - 35 USC § 112***

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the base material" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claims 2-18 variously depend from claim 1, they are rejected for the same reason.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobben et al, U.S. Patent 6103456 (hereinafter Tobben) in view of Takiguchi et al, U.S. Patent 6010956 (hereinafter Takiguchi).

As to claim 1, referring to figs. 1A-1F, Tobben discloses a method of applying a fill composition to a contact or via hole having a bottom and sidewalls and formed in a substrate, said composition being useful for protecting the substrate during etching processes, said method

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comprising the steps of : providing a quantity of a fill composition 28 ; and applying said composition to at least a portion of said bottom and sidewalls (See fig. 1D ).

As to claims 8-18, referring to figs. 1A-1F, Tobben discloses substantially the limitations of claims 8-18, as shown above, it also discloses the step of spin coating said composition to the surface of the substrate and to the bottom and sidewalls of the contact or via hole (See col. 14, lines 61-3).

But it does not disclose expressly the claimed ingredients and physical characteristics of the fill composition.

However, the missing limitations are well known in the art because Takiguchi discloses a protective compositions containing an acrylic polymer binder (See col. 3, line 60-col. 4, lines 37), a crosslinking agent (See col. 5, lines 5-34), a solvent systems including ether, ketone, and PGME (See col. 6, lines 16-38). Since Takiguchi' s composition includes essentially the same ingredients as the claimed composition, one would expect it to have similar physical characteristics as the claimed invention.

A person of ordinary skill is motivated to modify Tobben with Takiguchi because Takiguchi's composition have good characteristics to be used as coating in electronic application.

Therefore, it would have been obvious to combine Tobben with Takiguchi to obtain the invention as specified in claims 1 and 8-18.

4. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobben in view of Takiguchi and Cservak et al, U.S. Patent 4665007(hereinafter Cservak).

As to claims 2-5, Tobben discloses substantially the limitations of claims 2-5, as shown above. It also discloses that the fill composition occupies at least 50% of the depth of the hole (see fig. 1D). But it does not disclose expressly the steps of reflowing and cross-linking and the temperatures used.

As to claims 6 and 7, Tobben discloses substantially the limitations of claims 6 and 7, as shown above. But it does not disclose expressly the details about the thickness and viscosity of the composition used.

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However, the missing limitations are well known in the art because Takiguchi discloses a protective compositions containing an acrylic polymer binder (See col. 3, line 60-col. 4, lines 37), a crosslinking agent (See col. 5, lines 5-34), a solvent systems including ether, ketone, and PGME (See col. 6, lines 16-38), a curing temperature in excess of 110 C but not higher than 200 C (see col.12, lines 30-35). Since Takiguchi's composition includes essentially the same ingredients as the claimed composition, one would expect it to have similar physical characteristics as the claimed invention, and Cservak teaches the step of reflowing a polymeric composition to fill gaps (see summary). Besides, it is within the level of skill of a person of ordinary skill in the art to use an appropriate amount of well known solvents with a desired amount of well known polymeric binder to obtain the desired viscosity, and to deposit a desired amount of composition to meet the requirement of a specific application.

A person of ordinary skill is motivated to modify Tobben with Takiguchi and Cservak because Takiguchi's composition have good characteristics to be used as coating in electronic application.

Therefore, it would have been obvious to combine Tobben with Takiguchi and Cservak to obtain the invention as specified in claims 2-7.

5. Claims 1 and 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill et al ( U.S. Patent 6140226, hereinafter "Grill") in view of Das et al. ( U.S. Patent 5602198, hereinafter "Das").

As to claim 1, referring to figs. 3A-3G, Grill discloses a method of applying a fill composition to a contact or via hole having a bottom and sidewalls and formed in a substrate 8, 10, 12, 14, 38, said composition being useful for protecting the substrate during etching processes, said method comprising the steps of : providing a quantity of a fill composition 42 ; and applying said composition to at least a portion of said bottom and sidewalls (See fig. 3E). But it does not disclose expressly the details about the composition's physical characteristics .

As to claims 8-18, referring to figs. 3A-3G, Grill discloses substantially the limitations of claims 8-18, as shown above. But it does not disclose expressly the claimed ingredients, the physical characteristics of the fill composition, and the method of applying the composition.

However, the missing limitations are well known in the art because Das discloses an etch resistant compositions containing an acrylic polymer binder (See summary ), a crosslinking agent (See col. 2 , lines 43-50), a solvent systems including ether, ketone (See col. 7, lines 14-20 ), the composition having a molecular weight of less than 80000 (see col. 3, lines 21-24). Since Das's composition includes essentially the same ingredients as the claimed composition, one would expect it to have similar physical characteristics as the claimed invention. Besides, the examiner takes Official Notice that spin coating is a conventional method for depositing a polymer and PGME a conventional solvent for a polymer. It is within the level of skill of a person of ordinary skill in the art to use conventional method or material to perform the same function.

A person of ordinary skill is motivated to modify Grill with Das because Das' composition has good etch resistance, a characteristics desirable for a protective layer against etchants.

Therefore, it would have been obvious to combine Grill with Das to obtain the invention as specified in claims 1 and 8-18.

6. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill in view of Das and Cservak.

As to claims 2-5, Grill discloses substantially the limitations of claims 2-5, as shown above. It also discloses that the fill composition occupies at least 50% of the depth of the hole (see fig. 3E). But it does not disclose expressly the steps of reflowing and cross-linking and the temperatures used.

As to claims 6 and 7, Grill discloses substantially the limitations of claims 6 and 7, as shown above. But it does not disclose expressly the details about the thickness and viscosity of the composition used.

However, the missing limitations are well known in the art because Das discloses an etch resistant compositions containing an acrylic polymer binder (See summary ), a crosslinking agent (See col. 2 , lines 43-50), a solvent systems including ether, ketone (See col. , line -col.4, lines ), . Since Das's composition includes essentially the same ingredients as the claimed composition, one would expect it to have similar physical characteristics as the claimed

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invention, and Csérvák teaches the step of reflowing a polymeric composition to fill gaps (see summary). Besides, it is within the level of skill of a person of ordinary skill in the art to use an appropriate amount of well known solvents with a desired of well known polymeric binder to obtain the desired viscosity and to deposits a desired amount of composition to meet the requirement of a specific application.

A person of ordinary skill is motivated to modify Grill with Das and Csérvák because Das' composition has good etch resistance, a characteristics desirable for a protective layer against etchants.

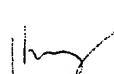
Therefore, it would have been obvious to combine Grill with Das and Csérvák to obtain the invention as specified in claims 2-7.

#### *Conclusion*

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (703)308-2706 . The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Neibling, can be reached on (703) 308-3325. The fax phone number for this Group is (703) 308-7722.

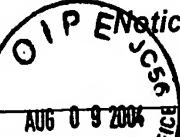
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Ha Nguyen

Primary Examiner

07 - 11 - 03

 <b>Notice of References Cited</b>		Application/Control No.	Applicant(s)/Patent Under Reexamination LAMB ET AL.	
		10/366,963	Examiner	Art Unit
		Ha T. Nguyen	2812	Page 1 of 1

AUG 09 2004

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
✓ A	US-6103456	08-2000	Tobben et al.	430
✓ B	US-4665007	05-1987	Cservak et al.	430
✓ C	US-6010956	01-2000	Takiguchi et al.	438
✓ D	US-5602198	02-1997	Das et al.	524
✓ E	US-6140226	10-2000	Grill et al.	438
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages		
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\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
 Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.